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Seroprevalence of dengue infection and its correlation with platelet count: A retrospective observational study.

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Abstract

Background:
Dengue fever is a virus that frequently spreads through mosquitoes in tropical and subtropical regions. Thrombocytopenia, a common hematological abnormality associated with dengue infections, is occasionally used as a measure of the illness's severity.

Aim:
To determine the seroprevalence of dengue infection and evaluate its correlation with platelet count in suspected cases.

Materials and Methods:
One hundred patients who were clinically suspected of having dengue were included in this retrospective analysis. Dengue NS1 antigen and IgM antibody testing were used for the serological diagnosis. Hematological records were used to determine platelet counts. The chi-square test was employed in the statistical analysis of the data to ascertain the correlation between dengue positivity and platelet count.

Results:
60 cases out of 100 samples tested positive for dengue, indicating a 60% seroprevalence. Dengue infection was substantially linked to thrombocytopenia. The platelet counts of most dengue-positive patients ranged from 50,000 to 100,000 cells/mm³. Low platelet counts and dengue infection were significantly correlated, according to statistical analysis ($p = 0.006$).

Conclusion:
Thrombocytopenia and dengue infection are strongly correlated. For dengue patients to be effectively managed and complications to be identified early, platelet count monitoring is crucial.

Recommendation:
In suspected or confirmed dengue cases, routine platelet monitoring is advised since thrombocytopenia reflects the severity of the illness and the likelihood of sequelae. Patients with low platelet counts must be closely monitored and given an early test diagnosis. To improve disease treatment and outcomes in dengue-endemic areas, public health awareness, vector control, and healthcare facilities must be strengthened.

Keywords: *dengue-endemic areas, public health awareness, platelet counts, platelet monitoring, thrombocytopenia*
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Introduction

The dengue virus, which belongs to the Flaviviridae family, causes dengue fever, an acute viral infection that is mainly spread to humans via the bite of an infected Aedes aegypti mosquito. It is one of the most significant diseases spread by mosquitoes that affects tropical and subtropical areas of the world, including India. Dengue has become more common in recent decades due to several factors, including rapid urbanization, population increase, climate change, and inadequate vector control. The disease's extensive distribution, seasonal outbreaks, and potential for serious sequelae have made it a major public health concern(1).

The World Health Organization (WHO) reports that millions of people are afflicted with dengue each year, with Asia and other tropical countries accounting for a significant share of cases. From a low fever to severe and potentially fatal conditions like dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS), the clinical signs of dengue infection can vary greatly(2). High fever, headache, retroorbital pain, myalgia, arthralgia, rash, and overall weakness are frequent presentations. If treatment is delayed, severe cases may result in circulatory failure, bleeding symptoms, and plasma leaks, all of which can greatly raise morbidity and death(3).

Thrombocytopenia, or a lower platelet count, is one of the most distinctive test results of dengue infection. Bone marrow suppression during the acute phase of infection, immune-mediated destruction of platelets, and increased peripheral consumption of platelets are some of the mechanisms that cause this syndrome. As a result, tracking platelet counts is crucial to the clinical assessment of dengue patients since it aids in determining the severity of the illness and anticipating potential consequences. For early diagnosis, appropriate treatment, and the avoidance of serious consequences, it is crucial to comprehend the connection between dengue infection and platelet count.(4).

The present study was conducted to determine the seroprevalence of dengue infection among clinically suspected cases and to evaluate the correlation between dengue seropositivity and platelet count. The findings are expected to contribute to improved laboratory diagnosis and clinical management of dengue patients through early identification of thrombocytopenia and disease severity.

Materials and Methods

Study Design

This retrospective observational study was conducted by reviewing the laboratory and hematological records of patients clinically suspected of dengue infection. Existing patient records were analyzed to determine dengue seropositivity and its association with platelet count.

Study Setting

The study was conducted at Bhagwan Mahavir Institute of Medical Sciences (BMIMS), Pawapuri, Nalanda, Bihar, India, a tertiary care teaching hospital providing outpatient, inpatient, emergency, laboratory, and specialty healthcare services to the surrounding population. The Department of Microbiology performs routine diagnostic investigations, including serological testing for infectious diseases such as dengue fever.

Study Duration

The study involved retrospective analysis of records collected over one year from 1 January 2025 to 31 December 2025.

Study Population and Sample Size

A total of 100 patients clinically suspected of dengue infection and investigated during the study period were included.

Inclusion Criteria

• Patients with clinical suspicion of dengue fever.
• Patients tested for dengue NS1 antigen and/or dengue IgM antibody.
• Patients with complete hematological records, including platelet count.

Exclusion Criteria

• Patients diagnosed with other causes of thrombocytopenia.
• Patients with incomplete laboratory or hematological records.

Variables Under Study

Independent Variable:
• Dengue infection status (positive or negative).
Dependent Variable:
• Platelet count.
Other Variables:
• Serological markers (NS1 antigen and IgM antibody).

Data Collection Methods

Data were obtained from laboratory registers and medical records maintained in the Department of Microbiology. Dengue diagnosis was established using NS1 antigen and IgM antibody test results. Corresponding platelet count values were retrieved from hematological records. All

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collected data were entered into a structured data collection sheet for analysis.

Statistical Analysis

Data were entered and analyzed using Statistical Package for the Social Sciences (SPSS) version 25.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were presented as frequencies and percentages. The Chi-square test was applied to determine the association between dengue positivity and platelet count. A p-value less than 0.05 was considered statistically significant.

Ethical Considerations

Permission to conduct the study was obtained from the concerned institutional authorities. Patient confidentiality was maintained throughout the study by anonymizing all records and using data solely for research purposes. Since the study involved retrospective analysis of existing records without direct patient involvement, no intervention was performed. If available, the Institutional Ethics Committee approval number and date should be included here.

Results

Table 1 shows the seroprevalence of dengue infection among the 100 clinically suspected cases included in the study. Of these, 60 patients tested positive for dengue infection, resulting in a seroprevalence rate of 60%, while 40 patients (40%) were dengue negative.

Table 1: Seroprevalence of Dengue Infection

Result	Number of Cases	Percentage
Dengue Positive	60	60%
Dengue Negative	40	40%
Total	100	100%

Table 2 presents the distribution of platelet counts among dengue-positive and dengue-negative patients. The majority of dengue-positive patients had platelet counts between 50,000 and 100,000 cells/mm³, followed by those with counts below 50,000 cells/mm³. Lower platelet counts were more frequently observed among dengue-positive patients compared to dengue-negative patients. Statistical analysis demonstrated a significant association between dengue infection and platelet count ($p = 0.006$).

Table 2: Correlation of Dengue Infection with Platelet Count

Platelet Count	Dengue Positive	Dengue Negative
<50,000	18	4
50,000–100,000	26	12
100,000–150,000	10	14
>150,000	6	10

p = 0.006

Since $p < 0.05$, the association between dengue infection and platelet count is statistically significant.

Figure 1 illustrates the distribution of platelet counts among dengue-positive patients. Most cases were concentrated in the 50,000–100,000 cells/mm³ category, indicating that thrombocytopenia was a common hematological finding among dengue-infected individuals.

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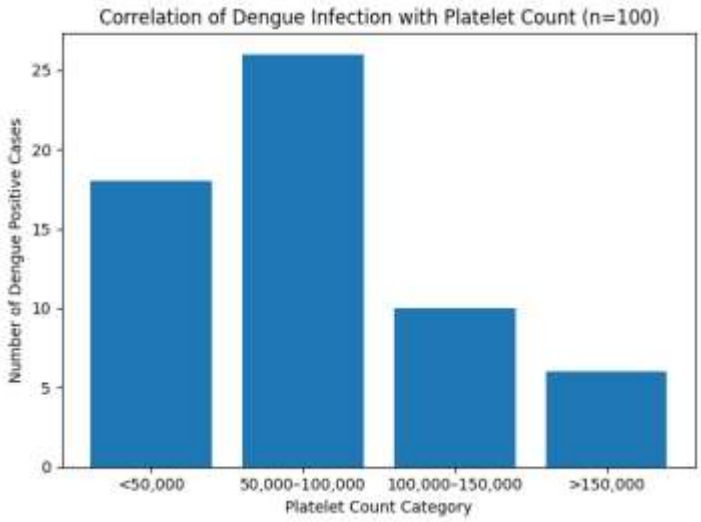

Figure 1: Distribution of platelet count among dengue-positive cases

Discussion

In tropical nations, dengue infection is still a serious public health concern. The seroprevalence of dengue infection in the current study was 60%, which is consistent with results from earlier hospital-based investigations. One of the most significant hematological signs of dengue illness is thrombocytopenia.(5). Most dengue-positive patients in our study exhibited platelet counts between 50,000 and 100,000 cells/mm³, which is indicative of mild thrombocytopenia.

A considerable number of cases also showed severe thrombocytopenia (<50,000), which may put patients at risk for bleeding problems.(6).

Platelet count and dengue infection were significantly correlated, according to the statistical analysis ($p = 0.006$). Numerous earlier studies have revealed similar results, highlighting the need for platelet monitoring in managing dengue. As a result, platelet count can be a helpful laboratory measure for evaluating the course of a disease and identifying people who may experience serious consequences. (7), (8).

Conclusion

A frequent viral infection with high morbidity is dengue fever. 60% of suspected cases had a seroprevalence, according to the current study. Thrombocytopenia and dengue infection were found to be significantly correlated, underscoring the significance of platelet count monitoring in dengue patients. Regular platelet count monitoring in conjunction with early diagnosis by serological testing can aid in prompt treatment and the avoidance of serious consequences.

Recommendation

According to the study's findings, patients with suspected or confirmed dengue infection should have their platelet counts regularly monitored because thrombocytopenia is a crucial hematological marker linked to the course of the illness and its consequences. To enable prompt diagnosis and treatment, early laboratory screening, such as serological testing and complete blood counts, should be used in medical settings. To avoid bleeding problems, patients with severe thrombocytopenia should be continuously monitored. Additionally, lowering the disease burden and enhancing patient outcomes in dengue-endemic areas requires bolstering public health awareness, vector control strategies, and healthcare infrastructure. To better understand the relationship between platelet count and dengue severity, more studies with bigger sample sizes are advised.

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Conflict of Interest
The authors declare that there are no conflicts of interest regarding the publication of this study.

List of abbreviations
WHO World Health Organization
DHF Dengue hemorrhagic fever
DSS, Dengue shock syndrome

Author Contribution
Sanjiv Kumar: Conceptualization, data collection, manuscript drafting, and literature review.
Kalyani Kala: Data collection, data interpretation, and manuscript review.
Kumari Preeti Ranjana: Study design, statistical analysis, manuscript preparation, and correspondence.
Trinain Kumar Chakraverti: Supervision, methodology development, critical revision of the manuscript, and interpretation of findings.
Arvind Kumar: Overall guidance, project administration, final manuscript review, and approval of the submitted version.

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